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## **CLAIMS**

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 Powders for inhalation of insulin obtained by spray drying a clear solution of insulin at pH under the isoelectric point of insulin where the 90% of microparticles showing particle size lower than 9 µm as volume diameter.

- Powders for inhalation of insulin obtained as Claim 1 having packing characteristics measured as tapped density lower than 0.2 g/cm<sup>3</sup>.
  - 3) Powders for inhalation of insulin obtained by spray drying a clear solution of insulin at pH under the insulin isoelectric point having microparticles showing particle shape defined corrugated or raisin like.
- 4) Powders for inhalation of insulin obtained by spray drying a clear solution of insulin at pH under the insulin isoelectric point having respirable fraction measured as fraction lower than 5 μm as aerodynamic diameter was more than 80%
  - 5) Microparticles according to claim 1 where a clear solution of insulin and excipients having a pH under the isoelectric point of insulin is spray dried.
  - 6) Microparticles according to claim 1 where the insulin solutions from which they are obtained have a pH preferably lower than 5.4.
  - 7) Microparticles according to claim 1 where the preferred excipients are saccharides, polysaccharides, aminoacids, phospolipids and polyalcohol the more preferred of them is mannitol.
  - 8) Microparticles according to claim 1 where the acid used for dissolution of insulin is a mineral acid such as 0.01 N hydrochloric acid.
  - 9) Microparticles obtained by spray drying a clear acidic solution of a therapeutic drug where the volatile organic acids used for dissolution of the said drug are partially evaporated during spray drying leaving particles that dissolved in distilled water give rise to a solution having pH higher than the original value.
  - 10) Microparticles according to claim 1 where the acid used for dissolution of insulin is a volatile organic acid.
  - 11) Microparticles according to claim 1 where the acids are used for dissolution of insulin is a volatile organic acid as diluted acetic acid.
  - 12) Microparticles according to claim 1 consisting essentially of insulin and the salts formed from the acids used for the insulin dissolution.

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- 13) Microparticles according to any claim from 1 wherein the microparticles contain less of 10 % salt by weight of total solids.
- 14) Microparticles according to claim 1 where the insulin is amorphous.
- 15) Microparticles according to previous claims having a particle size in the respiratory range allowing therapeutic application through administration to the lung.
  - 16) A process according to claim 1 wherein the solution to be spray dried contains from 5 up to 100 mg per ml of insulin.